

What is claimed is:

1. An electron projection lithography apparatus using secondary electrons, the apparatus comprising:

a secondary electron emitter which is spaced apart from a substrate holder by a first predetermined interval and has a patterned mask formed on a surface thereof to face the substrate holder;

a primary electron emitter which is spaced apart by a second predetermined interval from the secondary electron emitter in a direction opposite to the substrate holder and emits primary electrons to the secondary electron emitter;

a second power supply which applies a second predetermined voltage between the substrate holder and the secondary electron emitter;

a first power supply which applies a first predetermined voltage between the secondary electron emitter and the primary electron emitter;  
and

a magnetic field generator which controls paths of secondary electrons emitted from the secondary electron emitter.

2. The apparatus as claimed in claim 1, wherein the primary electron emitter is a plurality of micro-tips or carbon nanotubes to which the first predetermined voltage is applied from the first power supply and which emit the primary electrons toward the secondary electron emitter.

3. The apparatus as claimed in claim 2, wherein a spacer is disposed between the primary electron emitter and the secondary electron emitter to maintain an interval therebetween.

4. The apparatus as claimed in claim 1, wherein the magnetic field generator is comprised of permanent magnets or an electric magnet disposed below the first electron emitter and above the substrate holder.

5. The apparatus as claimed in claim 1, wherein the magnetic field generator is a DC magnetic field generator which surrounds sides of the secondary electron emitter and the substrate holder.

6. The apparatus as claimed in claim 1, wherein the secondary electron emitter is a plate selected from the group consisting of a doped diamond single crystalline plate, a doped magnesium oxide plate, a doped AlN plate, and a doped AlGaIn plate.

7. The apparatus as claimed in claim 1, wherein the mask is formed of a material used to intercept electrons.

8. The apparatus as claimed in claim 1, wherein the mask is formed by hydrogen processing or cesium (Cs) processing.

9. The apparatus as claimed in claim 1, wherein a positive voltage is applied by the second power supply, a negative voltage is applied by the first power supply, and the secondary electron emitter is commonly grounded.